PATENT
ATTORNEY DOCKET NO.: 040894-7153

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
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Atsushi KURABAYASHI et al.	)	Confirmation No.: 2402
	)	
Application No.: 10/519,103	)	Group Art Unit: 3721
	)	
Filed: December 27, 2004	)	Examiner: Candace E. Brakewood
	)	
For: ELECTRIC STAPLER AND PAPER FOLDER WITH PAPER CLOGGING PREVENTION CONSTRUCTION (As Amended)	)	

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Sir:

SUBMISSION OF SUBSTITUTE SPECIFICATION

In response to the Office Action dated March 7, 2007 in the above-identified application, the substitute specification submitted herewith is presented in order to correct errors pointed out in the Office Action.

No prohibited new matter has been added by way of this substitute specification. Entry and consideration of the substitute specification is respectfully requested.

Except for issue fees payable under 37 C.F.R. §1.18, the commissioner is hereby authorized by this paper to charge any additional fees during the pendency of this application including fees due under 37 C.F.R. §1.16 and 1.17 which may be required, including any

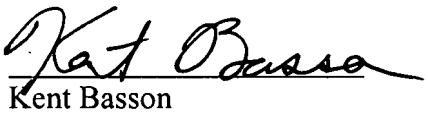
required extension of time fees, or credit any overpayment to Deposit Account 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. §1.136(a)(3).

If the Examiner has any further questions relating to this Reply or to the application in general, he is respectfully requested to contact the undersigned by telephone so that allowance of the present application may be expedited.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

Dated: May 31, 2007

By: 
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DESCRIPTION

ELECTRIC STAPLER AND PAPER FOLDER WITH PAPER CLOGGING PREVENTION CONSTRUCTION

Technical Field:

[0001] The present invention relates to an electric stapler mounted to a binding processing apparatus for carrying out sheet binding and folding.

Background Art:

[0002] There is known a binding processing apparatus for striking a staple on a center line in a left and right direction of stacked sheets of paper and folding the sheets into two by a sheet folding mechanism using a pinch roller. Further, there is also known a copier including a binding apparatus of this kind.

[0003] Fig. 5 shows an example of a conventional binding processing apparatus art including an electric stapler 1, a sheet folding mechanism 2 and a stack tray 3. The stack tray 3 for receiving sheets discharged from a copier (not illustrated) is inclined to align a sheet end automatically by the weight of the sheet, and a lower end portion thereof is arranged with a sheet aligning stopper 4 of a lifting type. A middle portion of the stack tray 3 in an up and down direction is arranged with a plurality of the electric staplers 1 aligned horizontally parallel to each other, and a clincher unit 5 arranged on a rear face side and a driver unit 6 arranged on a surface side are opposed to each other by interposing the stack tray 3. The sheet folding mechanism 2 comprising a pair of pinch rollers 7 and a push blade 8 is arranged on a lower side of the electric stapler 1, and a push blade 8 disposed on the rear face side is opposed to a tangential line of the pair of pinch rollers 7 disposed on the surface side. A position of the lifting type sheet aligning stopper 4 in an up and down direction is controlled by a control portion of the

binding processing apparatus in accordance with a size of sheet, and when a sheet is dropped from the copier to the stack tray 3 to impinge on the sheet aligning stopper 4 to stop, a middle point of sheet in a front and rear direction coincides with a position of a driver of the electric stapler 1. When one set of sheets is fed to the stack tray 3, the electric stapler 1 is started to strike staples to a plurality of portions of the sheets at the middle point in the front and rear direction to bind and thereafter, the sheet aligning stopper 4 is driven to move down to lower the position of the sheet. The control portion provides signals to move the sheet aligning stopper 4 the same distance as the driver and a clincher of the electric stapler 1 and the push blade 8 of the sheet folding mechanism 2, and when the sheet aligning stopper 4 is stopped, a front end of the push blade 8 is opposed to a position of striking the staple (center line of sheet). Further, the push blade 8 is driven in a direction of the sheet by a cam mechanism to press a portion of sheet to be bound to between a pair of pinch rollers 7. The pinch rollers 7 rotate to pull a sheet while folding the sheet to discharge on the opposite side. In this way, a copied document or the like is center-bound and folded in two to be finished as a center-bound document.

[0004] Although the above-described is the configuration of the conventional binding processing apparatus, when the sheet aligning stopper 4 is moved down after the staple processing, there is a case in which the sheets are warped or inclined by friction between the sheets and the stack tray 3. When such a situation occurs, a position of striking the stapler to the sheet and a position of the push blade do not coincide with each other, and the binding position and the position of a fold line are shifted from each other.

[0005] Hence, in order to resolve the above-described drawback, as shown by Fig. 6, there is proposed a configuration in which staple processing and sheet folding are carried out without carrying out positioning for sheet folding after staple processing by arranging the electric stapler

and the sheet folding mechanism 2 at the same position. However, in this case, in order to prevent the driver unit 6 of the electric stapler 1 and the pinch roller 7 from interfering with each other, as shown by Fig. 7, it is necessary to divide the pinch roller 7. In addition, the pusher blade 8 needs to notch a portion thereof brought into contact with the clincher unit (not illustrated) to prevent the pusher blade 8 from being interfered with the clincher unit. Therefore, when the center line of sheets is segmentally pressed by the divided pinch rollers, a portion of sheet which is not pressed over a length in correspondence with a width of the driver unit 6 and the clincher unit, the sheet folding is incomplete. Further, sheets move to the pinch roller 7 after staple processing and therefore, sheet clogging may be a problem. Hence, there is a need for improving finish and preventing sheet clogging in a binding processing apparatus having a constitution in which staple processing and sheet folding are carried out at the same position, and it is an object of the invention to resolve the above-described problem.

Disclosure Of The Invention

[0006] The invention has been proposed to achieve the above-described object. An electric stapler includes a driver unit having a driver and driver lifting means, and a clincher opposed to the driver, in which sheets are pinched by the driver unit and the clincher, a staple is injected by driving the driver, and a leg portion of the staple is folded by the clincher to bind the sheets. Recess grooves are formed at two contiguous portions of a staple injecting port disposed at a bottom face of the driver unit. A side of the clincher is provided with a press blade paired with the recess grooves fitted with each other and the press blade lifting means. The sheets are pressed by the press blade and the recess groove by driving the press blade after operating to bind the sheet to form a fold line.

[0007] Further, the electric stapler is provided with press blade control means for forming the fold line by pressing the sheets with the press blade and the recess grooves by driving the press blade after operating to bind the sheets.

[0008] Further, the electric stapler may be provided with switching means for switching on and off to operate the press blade lifting means.

Brief Description Of The Drawings:

[0009] Fig. 1 shows one embodiment of the invention and is a side view of an electric stapler.

[0010] Fig. 2(a), Fig. 2(b) and Fig. 2(c) are front views showing a procedure of operating the electric stapler of Fig. 1.

[0011] Fig. 3(a) and Fig. 3(b) show an electric stapler, Fig. 3(a) is a side view in standby, and Fig. 3(b) is a side view in binding.

[0012] Fig. 4(a), Fig. 4(b) and Fig. 4(c) are front views showing a procedure of operating the electric stapler of Fig. 3.

[0013] Fig. 5 shows a conventional art and is a side sectional view of a binding apparatus.

[0014] Fig. 6 shows another embodiment and is a side sectional view showing another mode of a binding processing apparatus.

[0015] Fig. 7 is an explanatory view showing an arrangement of a mechanism of the binding processing apparatus of Fig. 6.

[0016] Further, in notations of the drawings, reference number 11 designates an electric stapler, reference number 12 designates a driver unit, reference number 13 designates a clincher unit, reference number 16 designates a clincher driving cam, reference number 17 designates a clincher, reference number 19 designates a press blade, reference number 20 designates a blade driving cam, reference number 21 designates a recess groove, reference number 31 designates an

electric stapler, reference number 32 designates a driver unit, reference number 35 designates a clincher, reference number 36 designates a press blade, reference number 37 designates a blade driving cam, and reference number 38 designates a recess groove.

Best Mode For Carrying Out The Invention:

[0017] A detailed description will be given of a mode for carrying out the invention in reference to the drawings as follows. Fig. 1 shows the electric stapler 11. Reference number 12 on an upper side designates the driver unit and reference number 13 on a lower side designates the clincher unit. A driver link 14 provided at the driver unit 12 is moved up and down to inject a staple from a staple magazine 15 to a lower side by a driver (not illustrated) in a shape of a thin plate attached to a front end portion of the driver link 14. The clincher drive cam 16 drives the clincher 17 to reciprocate in an up and down direction, and by moving up the staple magazine 15 by pressing sheets (not illustrated) to a bottom face of the driver unit 12 by moving up the clincher 17, the driver link 14 and the driver at the front end are moved down relative to the staple magazine 15. A leg portion of the staple injected by the driver impinges on a recess groove 18 at a center of the clincher 17 to be folded.

[0018] The press blade 19 is contained inside of the clincher 17 and is driven to reciprocate in the up and down direction by the blade driving cam 20 inside of the clincher 17. As shown by Fig. 2, a center portion of an upper end of the press blade 19 is notched so as not to be interfered with the driver and the staple S, and left and right upper end portions thereof can be projected to an upper side through a groove (not illustrated) formed at the upper face of the clincher 17. The recess grooves 21 in correspondence with the press blade 19 inside of the clincher unit 13 are formed on left and right sides of a staple injecting port disposed at a center of a bottom face of

the driver unit 12, and when the press blade 19 is moved up, the left and right upper end portions of the press blade 19 are fitted to the recess grooves 21.

[0019] Next, operation of the electric stapler 11 will be explained. Fig. 2(a) shows an initial state in which the clincher 17 inside of the clincher unit 13 is disposed at a lower standby position, and also the press blade 19 inside of the clincher 17 is disposed at a lower standby position. Further, as shown by Fig. 2(b), when one set of sheets P is supplied to between the driver unit 12 and the clincher unit 13, the clincher drive cam 16 starts rotating to move up the clincher 17 to pinch the sheet between the clincher 17 and the bottom face of the driver unit 12. Simultaneously therewith, the driver inside of the driver unit 12 is driven to move down to inject the staple S to the lower side to bind the sheets. Successively, as shown by Fig. 2(c), the blade driving cam 20 starts rotating to move up the press blade 19. The press blade 19 pushes the sheet P to the recess grooves 21 at the bottom face of the driver unit 12 to thereby attach folds at two left and right contiguous portions of the stapling portion. Further, after binding and pressing, the clincher driving cam 16 and the blade driving cam 20 rotate by one revolution, and the clincher 17 and the press blade 19 return to an initial state of Fig. 2(a).

[0020] Fig. 3(a) and Fig. 3(b) show the electric stapler 31 of a clincher fixed type as another embodiment. A staple magazine holder portion 33 of the driver unit 32, and a driver link 34 and a driver (not illustrated) are driven to move up and down. The press blade 36 and the blade driving cam 37 are included inside of the fixed type clincher 35 similarly to the above embodiment, and when the blade driving cam 37 is rotated by one revolution from the initial position, the press blade 36 is moved up and down from the lower standby position one reciprocation. Further, the recess grooves 38 in correspondence with the press blade 36 are formed on left and right sides of a staple injecting port formed at a bottom face of the staple

magazine holder 33 and when the press blade 36 is moved up, left and right upper end portions of the press blade 36 are fitted to the recess grooves 38 similar to the electric stapler 11 shown in Fig. 1 through Fig. 2(c).

[0021] Fig. 4(a) through Fig. 4(c) show operation of the electric stapler 31. In an initial state of Fig. 4(a), the press blade 36 inside of the clincher 35 is disposed at the lower standby position. As shown by Fig. 4(b), when one set of sheets P is supplied between the driver unit 32 and the clincher 35, a driver driving cam 39 rotates to integrally move down the staple magazine holder portion 33 and the driver link 34 to pinch the sheets between the bottom face of the staple magazine holder portion 33 and the clincher 35. Further, as shown by Fig. 3(b) and Fig. 4(b), the driver link 34 is further moved down, and the driver injects the staple S into the lower side to bind the sheets. Successively, the blade driving cam 37 starts rotating, as shown by Fig. 4(c), the press blade 36 is moved up, and the press blade 36 presses the sheets to the recess grooves 38 at the bottom face of the staple magazine holder portion 33 to attach the folds at two left and right contiguous portions of the stapling portion of the sheets. Further, after binding and pressing, a driver driving cam 39 and the blade driving cam 37 rotate by one revolution to return the staple magazine holder portion 33, and the driver link 34 and the driver to the upper standby position, and the press blade 36 is moved down to return to the initial state of Fig. 4(a).

[0022] Further, although in the above-described embodiments, an explanation has been given of the constitution of starting to move the press blade after stapling, there may be substituted a cam mechanism such that sheets are clamped between the driver unit and the press blade by driving to move up the press blade before the binding operation, and the press blade is further driven to move up after stapling to press, thereby, sheets to prevent positional shift of sheets.

Further, useless pressing may avoided in binding an end portion of sheets by providing controlling means or a change over switch for stopping to operate the blade driving cam.

[0023] Further, the invention is not limited to the above-described embodiments but can variously be modified within a technical range of the invention and the invention naturally includes the modifications.

Industrial Applicability:

[0024] According to the invention, a fold line by the press blade is formed to be proximate to both sides of a portion of sheets for striking the staple and therefore, the electric stapler for carrying out an excellent finished product is provided. Further, stapling and sheet folding are carried out without the sheets shifting and, therefore, an electric stapler having high stability without bringing about sheet clogging is provided.